Influence of the oblique magnetic field on surface sputtering and secondary electron emission

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For modeling of hydrogen isotopes capture and reflection, plasma–facing materials sputtering and secondary emission as well as for analysis of experimental data in the plasma sheath region it is necessary to determine correctly the inflow and outflow of charged particles at the surface [1]. The value of the potential drop determines the energy of incident particles and therefore affects the surface sputtering as well as secondary electron–electron emission [2,3].

In this work the influence of the oblique magnetic field on the potential profile in the Debye sheath and magnetic presheath is computationally investigated. An approximation function of the potential distribution in sheath taking into account magnetic field is obtained. This function describes the potential profile dependences on the magnitude and angle of magnetic field to the surface as well as on plasma parameters. The influence of magnetic field inclination on the energy and angular distribution of particles reaching the wall is revealed. The dependences of secondary electron emission and sputtering coefficients on the magnetic field inclination for the different plasma faced materials are calculated. The effect of electron to ion temperatures ratio on the processes of plasma-wall interaction is also investigated.

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